

Remote Controlled Non-Lethal Weapons Applications

Presented at

NDIA 16th Annual Security Technology Symposium

Williamsburg, Virginia June 26-29, 2000

Event #049

Author:

J.F. McNulty

TASERTRON

1785 Pomona Rd. Suite C

Corona, CA 91720

UNCLASSIFIED

REMOTELY CONTROLLED NON-LETHAL WEAPON APPLICATIONS

By J. F. McNULTY

INTRODUCTION:

This, Non-Lethal category, paper will discuss a variety of applications of remotely controlled Taser™ weapons for both military and non-military use. These weapons can be used for:

- Force protection
- Physical/Facility security
- Tactical and Operations security
- Prison/Corrections security.

Two remote weapons ultimately protect assets, personnel and facilities against intrusion and from deranged assailants, saboteurs, mob action or insurrection. The weapons use well-proven Taser technology. The technical paper on the weapons' operating principles is published in the proceedings of the 15th NDIA Security Technology Symposium.

Tasertron exclusively manufactures Taser™ weaponry for Law Enforcement, Federal Agencies, and the U.S. military. Over 400 major U.S. law enforcement agencies including NYPD, LAPD and LASO have successfully used the Taser more than 50,000 times in the past twenty years without a fatality due to the Taser's output. The weapons have had 85 % effectiveness in the field and a laser sight has increased that effectiveness to the 90-percentile range. The US Department of Justice has been using the Tasertron Taser for security at their Washington, DC headquarters for more than four years. The Federal Air Marshals successfully evaluated the weapon and are hoping for funding. Since a Taser will quickly take down a subject in police body armor **or US/ NATO Flak jackets**, Tasertron does not sell to civilians (the darts don't penetrate, but the electricity arcs through the weave of the armor). The Taser works well in heavy rain as proven at a Fort Benning, Georgia demonstration. The Taser is also more effective than a 9-mm bullet since it is not necessary to hit a vital organ to quickly stop an assailant. The Taser will also penetrate over two inches of clothing. The Taser has been proven safe when used as directed, by extensive studies and testing by the Medical Director of the U.S. Consumer Product Safety Agency (a federal agency) and other medical and safety agencies.

Operation, & Health and Safety considerations:

All Taser weapons incapacitate in the same way. A High Voltage signal is used to penetrate soft body armor, military Flak Jackets (it arcs through the weave) and up to two inches of clothing. A repetitive, very low power, very narrow pulse (4-10 µsec.) is then used to cause the near surface voluntary motor control nerves and muscles between the contacts to spasm uncontrollably. The spasms override the brain's motor control signals and overwhelm the feedback to the brain. This causes the brain to shut down the voluntary motor control system and the person will fall within 0.5 to 3 seconds. The subjects remain conscious and coherent but cannot control their limbs until the power has been turned off and they recover.

The 4-10 microsecond Taser pulses are too high in frequency to penetrate deeply enough to affect the involuntary motor or cardiac systems.

Heart rhythm remains unaffected, and in many thousands of field deployments, there are no reported incidences of involuntary urination, defecation, or vomiting. This indicates the pulses did not penetrate deep enough to affect the muscles of those organs. The muscle spasms are similar to those of an epileptic seizure except the person remains conscious, coherent and can still control respiration; they simply cannot control their limbs.

Contractions of the chest wall can potentially interrupt breathing motions, but they resume immediately during the off portion of the Taser duty cycle. No amount of strength, determination, adrenaline or drugs can overcome these effects. When the Taser power is turned off the subject will recover in a time proportional to the time the signal was applied. After being Tasered the subject will not be fit for combat due to the severe fatigue and muscle soreness which can last from hours to days. The subject's lactic acid levels may be temporarily elevated. Eventually the subject will fully recover with no adverse effects. Medical literature concerning severe epileptic seizures that sometimes last for hours leads to a reasonable expectation that Tasering for periods of 30 minutes or more will not result in permanent disability, mortality or morbidity. The only obvious exception would likely occur if a dart penetrated the globe of the eye of a Tasered subject. In that case, permanent blindness in the Tasered eye may be possible but not a certainty. Of course, the use of the aimable Sentinel weapon would be expected to prevent such an injury.

The Taser has been operational and deployed in civilian applications for two decades during which some 50,000 uses upon a widely diverse and representative population has occurred. Included have been a seventy-year-old man, a twelve-year-old boy, and several pregnant women. The UL Ventricular fibrillation standards are set for the safety of a 2-year-old child and we are well below that level. Animal studies using spontaneously breathing anesthetized swine of the approximate weight of an adult human have determined that currents of even four times that of the standard Taser does not result in permanent injury. Taser currents applied directly to the heart itself, did not cause injurious heart rhythm disturbances. In all tests, the on-off duty cycle of the Taser allowed ample time for the subject animals to breathe sufficiently to prevent even partial or transient asphyxiation. This was true even when electrodes were placed directly across the animal's rib cage. Since 50,000 uses without a Taser induced fatality, and all animal and human studies to date, have repeatedly indicated that Taser technology is effective and safe, it is expected that any future studies, if required, will yield similar findings.

Tasertron invented several proprietary Non-Lethal Alternatives to the lethal Anti-Personnel Landmine. Tasertron also introduced the Taser Area Denial Device (TADD) at the NDIA Non-Lethal Defense III Symposium at John Hopkins University in 1998. The paper entitled "A Non-Lethal Alternative to Anti-Personnel Land Mines" is available at [www.NDIA.org/past events](http://www.NDIA.org/past%20events).

In 1999 Tasertron and PRIMEX Aerospace Company (prime contractor) teamed and won a US Army ARDEC concept and evaluation contract for a non-lethal Taser munition. The Joint Non-Lethal Weapons Directorate (JNLWD) under the direction of the USMC funded the contract. The final demonstration of that contract was successfully completed in January 2000. Tasertron has now used the original Non-Lethal TADD to develop the concepts for two remotely controlled non-lethal security weapons: The RC TADD and the Sentinel.

They will protect facilities against mobs or hostile intruders without risk of capture or injury to security personnel. They will incapacitate intruders for up to an hour. The devices can be accurately controlled by video link from remote hardened bunkers that will protect security personnel from gunfire and bomb blasts. The Tasered subject will fall within a second or two and is incapacitated for as long as the Taser output is applied.

The first paper emphasized the major military applications such as:

- ◆ The two remote control weapons presented can be used for force protection in perimeter control. One (the Sentinel) can also be part of a dual force weapons platform.
- ◆ Small guard contingents, such as US Marine embassy forces can remotely use Non-Lethal force, from internal hardened security rooms or bunkers, to repel assaults by mobs, without exposing the guards to capture or injury. This would permit time for outside forces to form to control the situation without the embassy guards using their lethal firepower.
- ◆ In Military Operations Other Than Warfare (MOOTW) the weapons can enforce border restrictions, and protect facilities and supplies without risk to the security forces.
- ◆ They can also provide school protection from deranged assailants.

In the past year law enforcement, corrections, civil agencies, universities and the military have also suggested a number of new applications for these weapons. These have included:

- ◆ Layered security for critical high value unmanned assets. The layers would consist of signs and or verbal warnings, then fences, followed by obstacles such as razor wire. Automated Non-Lethal Taser weapons, which would alert the closest security forces, would be the first active layer of defense finally, if all are breached, automated lethal force can be applied.
- ◆ Using the RC Sentinel for Postal facility security from a remote facility to protect against disgruntled employees and deranged people.
- ◆ A gimbaled but manually aimed, stacked Sentinel array mounted on a “Humvee” for Non-Lethal crowd control in MOOTW. The Taser has a very great intimidation effect.
- ◆ Mounting multiple Sentinels in critical prison areas where fights and riots are likely. Such as cafeterias, recreation rooms, and exercise areas. This would permit maintaining order and quelling a disturbance without the presence of guards, minimizing the risk of correction officers being taken hostage or injured. Each quad Sentinel station could incapacitate 28 subjects while protecting each other from assault.
- ◆ For US Border Patrol use the RC TADD permits one officer to control many TADDs through several surveillance cameras.
- ◆ Swat officers suggested placing units near the door of buildings containing barricaded suspects and remotely firing them when the suspect finally comes out to avoid a final battle or a suicide.
- ◆ Canadian police suggested mounting the RC TADD or the Sentinel to Bomb Disposal robots, which are also used against barricaded suspects, to protect officers and hostages.

Both weapons use common technology and many common components used by existing police Taser weapons. Neither of the devices would cause any long-term harm to non-combatants, even if accidentally tripped while active. Both multiple Taser weapons can substantially reduce the cost of perimeter security by eliminating/ supplementing guard towers and patrols. Currently a prison guard tower cost over \$200,000/year to man. The TADD does not self-destruct. It is field reloadable and can be reused for years to reduce costs.

The Remote Controlled (RC), multi-cartridge, Taser weapon;

This weapon is a modified **TADD** that can be remotely fired from a security station rather than automatically firing when the TADD's sensors are tripped.

The RC TADD's alarm transceiver is used to receive the firing command, and disarm commands. The remote operator may view the protected area from any standard security camera in the area. The RC TADD covers an arc of 120 degrees and can fire 7 pairs of darts at 20-degree angles to a range of 30 feet. It will take down multiple intruders. For denser coverage, a second firing module can be added in the field, with an automatic offset of 10 degrees to fire 14 pairs at ten-degree separation. The RC TADDs are usually mounted at ground level and are camouflaged but they can be reversed and mounted at 6-7 foot height from platforms or overhangs. Random dummy units can be used to fill in very large areas; they should be periodically interchanged with live units. The operator may choose (in accordance with his general orders) to manually fire one of the RC TADDs when intruders come within range of that TADD.

Or in the case of an unarmed or accidental intruder such as a child, he may recommend sending out a security patrol to secure the area.

In military corrections or POW camp use, either the non-lethal TADD or the RC TADD configuration would permit a small group of centrally located guards to cover the entire facility perimeter. The guards would respond to remote security video cameras or to specific alarm points, sent by the tripped TADD, to secure any escapees or intruders while they are held incapacitated by the TADD. The device covers a radius of 30 feet and can be remotely triggered.

Force Protection, perimeter control application:

The RC TADD when emplaced along the force protection perimeter could incapacitate a number of subjects. The RC TADD would be combined with video cameras to provide remote surveillance and firing of the TADD without the normal sensors. The choice of which TADD configuration to employ would depend on the operation and manpower available. To control large areas with minimum manpower the automatic trip actuated TADD would be preferred. To control smaller areas with minimum force the RC TADD would be preferred since it would prevent accidental firing and could control accidental intrusion without the use of force by having the intruding subjects escorted from the area. The TADD when fired would hold the subjects incapacitated until arresting troops arrive. The intruders can also be safely exposed for a fixed maximum duration (until the batteries deplete) and could then withdraw after they recover. The TADD would reduce the death and injury of troops from altercations with intruders. It also would release troops from constantly patrolling the area and permit the troops to cover additional areas. The Taser arcs penetrate soft body armor and because of the darts can be made to penetrate most chemical/biological warfare gear. The TADD can be shut down remotely when not needed.

The Multi-shot Remote Controlled Sentinel:

The main difference between the RC TADD and the Sentinel is that the Sentinel can be, remotely, precisely aimed in both azimuth and elevation and fires multiple; individual bore sighted shots on command. The power to the Sentinel is usually hard wired and the device is not limited to the life or capacity of a battery.

The Non-Lethal, remote controlled, Taser™ “**SENTINEL**” uses a modified TADD as its heart. The Sentinel can remotely fire one aimed shot at a time. Each Sentinel magazine (TADD assembly) contains seven (7) shots the magazines may be stacked to increase capacity. Remote control is via a bore-sighted video camera on the weapons platform.

Triggered remotely, the Sentinel can be fired as fast as the operator can aim and hit the trigger. Once fired each Taser dart pair remains activated until manually turned off by the operator. Seven subjects, per magazine, can be kept incapacitated at once by the independent Taser circuits. The Sentinel covers an arc of 160 degrees 30 feet deep. For maximum security, the weapons should be placed for interlacing coverage to protect each other from close quarter attack. The Sentinel should be mounted high enough that the security officer has good visibility and aim-ability in crowded areas, generally at 8-10 foot ceiling height. Sentinels can be partially recessed.

The Taser Sentinel is intended to protect military facilities and other key facilities such as airports, embassies, armories, TV and radio stations from assault by individual intruders or during major demonstrations or riots, when reserves may be temporarily depleted, without resorting to lethal force. A number of the devices would be attached to the building or facility so that in addition to denying access they also cover each other from assault. The device can also be used to cover internal corridors and access doors against armed intruders. For MOOTW the Sentinel can be turret mounted on food distribution trucks to protect them from looting etc. or on other vehicles for crowd control. This Non-Lethal weapon is remotely controlled via video from a hardened security room within the facility or from the vehicle cab.

The Sentinel is also useful for Military Force Protection operations and can be part of a dual force capability system. This would minimize force against intruders and agitators that are lightly armed while providing a longer range, lethal option, against suicide attacks or heavily armed assailants as part of a common weapons platform. **The Sentinel acts as a force multiplier, permitting one soldier to view wide areas and command multiple weapons platforms, which may be dual force with back up long range lethal weapons on a common platform.**

For Law Enforcement and other government agencies the Sentinel can provide observation and direct intervention from a remote location without endangering personnel. It also records evidence of any assault and may identify the people involved. In addition to the obvious State Department Embassy protection application it also has significant application in both State and Federal prison and corrections applications, as well as school, court and asset protection.

Maintainability:

The only maintenance required is to reload the weapon in the field after it has been triggered, to replace batteries (if battery powered) when depleted by activation, or at end of life and to maintain the video link. The tasks require no special equipment or skills and minimal training.

SUMMARY:

The system uses existing well proven devices and components that are in current military and police use, reducing costs. These components include the field proven Taser circuitry and cartridges and various military intrusion detectors, remote control systems, and batteries.

Contribution of the RC TADD to Military Force Protection, perimeter control and facility security:

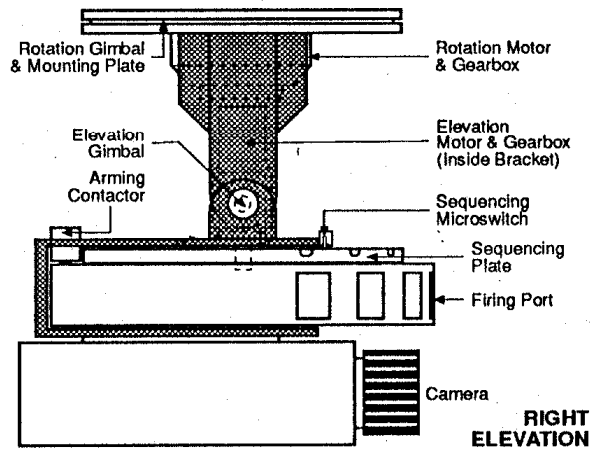
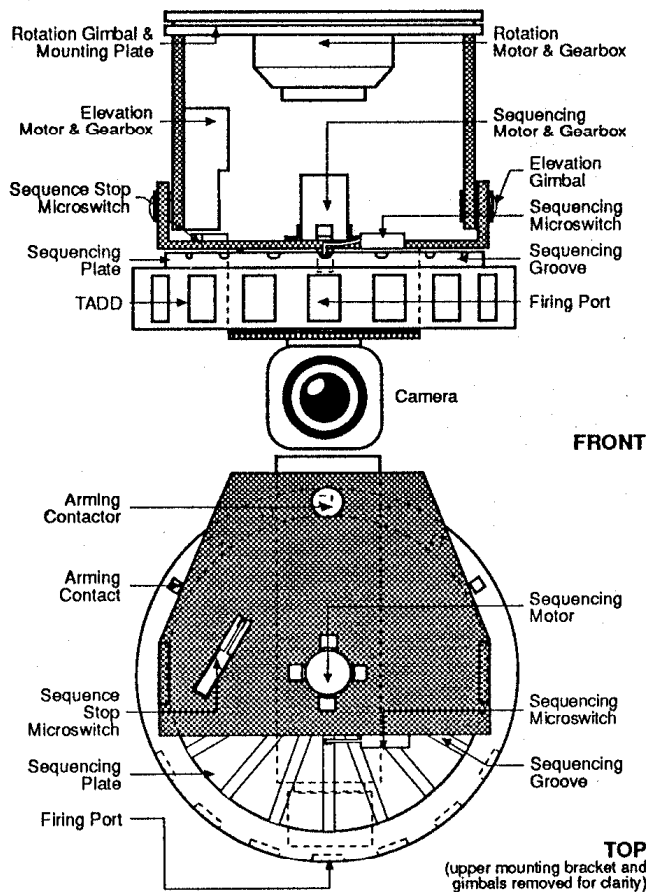
- ◆ It would reduce the number of troops required to maintain the security of an area.
- ◆ It would give troops/MPs early warning and the exact location of an intrusion.
- ◆ It would stop, incapacitate and hold intruders until troops arrive to capture them without a fight.
- ◆ The intruders could no longer fight or flee.

Contribution of the Sentinel to military operations:

- ◆ It will protect facilities against intrusion or damage by demonstrators, looters or Saboteurs.
- ◆ The Sentinel acts as a force multiplier, permitting one soldier to view wide areas and command multiple weapons platforms.
- ◆ When vehicle mounted it can prevent food and supply trucks from being overrun by looters in humanitarian rescue missions or MOOTW operations.
- ◆ Stacked and “Humvee” or vehicle mounted it can control crowds, through intimidation or non-lethal force.
- ◆ It can protect our embassies from assault by mobs, without exposing Marine guards to injury or capture and provide time for outside forces to deploy.
- ◆ It can protect internal corridors/access doors against armed intruders without risk to guards.

Contribution of the Sentinel to non-military agencies:

- ◆ For the same manpower cost we can provide denser protection of a Non-Lethal nature.
- ◆ In foreign territory, embassies and other US facilities can be protected by humane, Non-Lethal means. Currently, the choice is passive barriers or lethal force. There are no reasonable delaying tactics or Non-Lethal weaponry in use.
- ◆ These remote Taser weapons will resolve any small group assault quickly. In the case of mob action they provide a very intimidating but Non-Lethal defense for a few hours to permit the deployment of assistance from outside forces, without risking injury or capture of our security personnel.
- ◆ The Sentinel can prevent Columbine type school takeovers and other assaults with very few security officers and do so humanely without loss of life of either the students or the deranged persons. The Sentinel is continuously monitoring and would also catch people damaging school property or planting dangerous devices.
- ◆ The Sentinel can provide unobtrusive Non-Lethal protection and observation for any public building or venue with minimum continuing manpower cost.
- ◆ In jails and prisons it minimizes manning costs and protects officers from assault, injury or hostage taking. Officers do not man hazardous areas.
- ◆ After an incident, officers enter the area secure the incapacitated inmates and clear the area without the necessity of using further force.
- ◆ These devices from a remote location, such as a police station or a roving security patrol can protect unmanned assets.



TASERTRON		Taser Sentinel Non-Lethal Perimeter Control Device	
DRAWING VERSION: 2.0		DRAWING BY: Kevin McNulty	
DATE: 2 February 1999		VIEW: Front, right elevation, top	
SHEET: 1 of 2			

FIG. 3 Tasertron Sentinel - Exterior

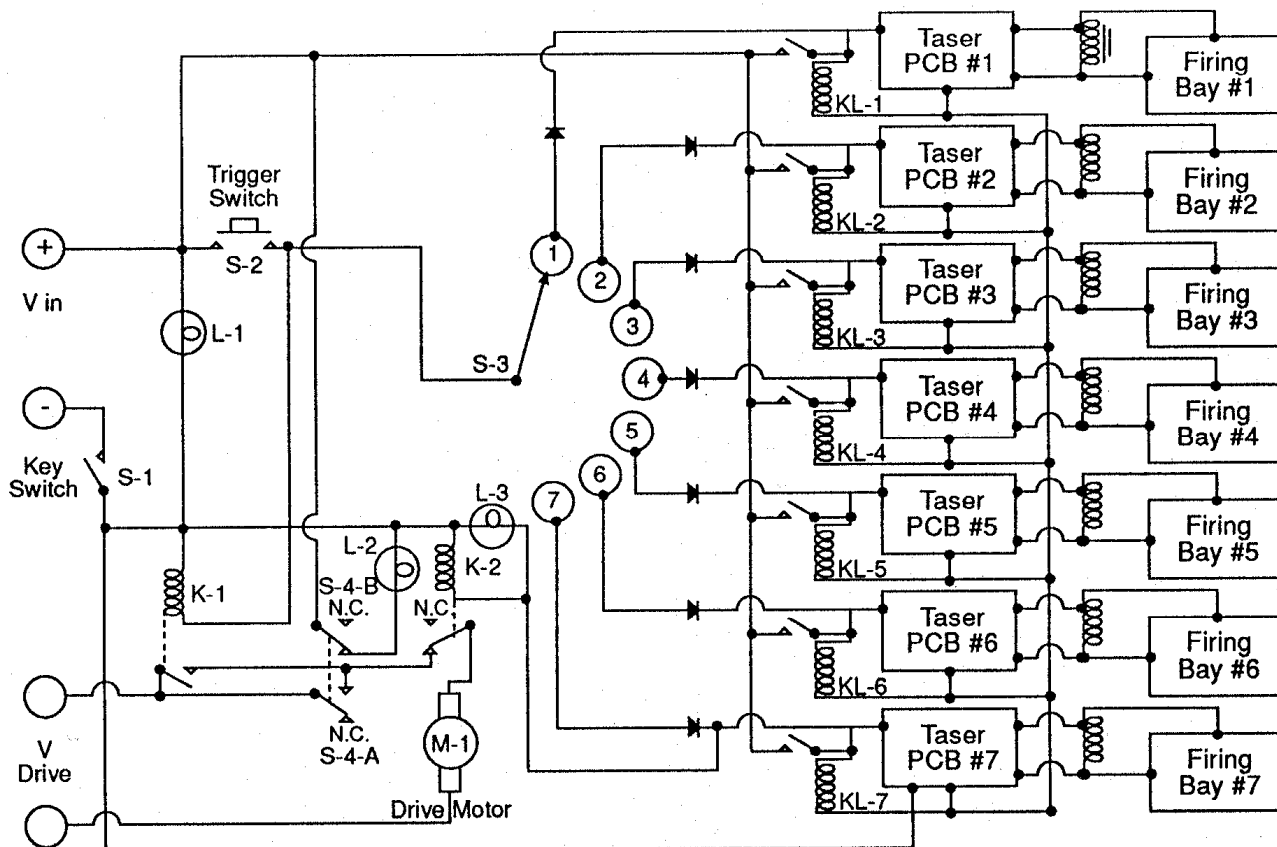


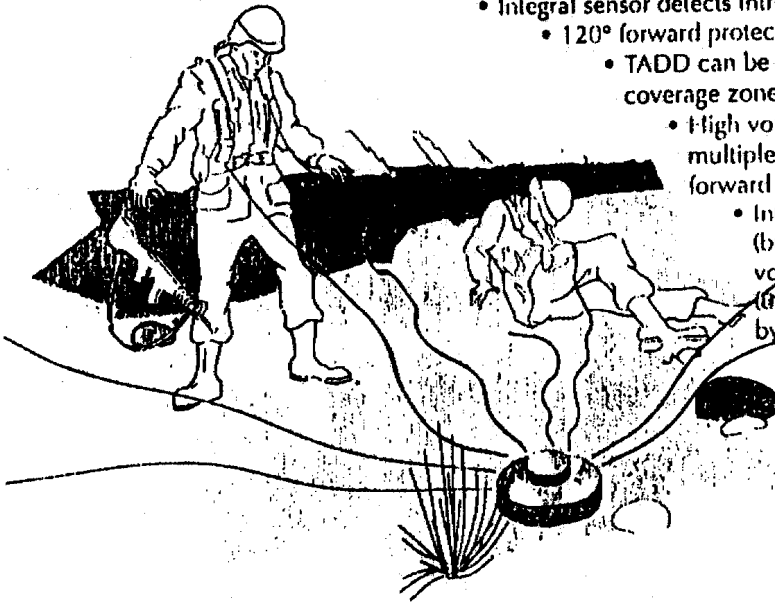
FIG. 4 Tasertron Sentinel - Wiring Diagram

Non-Lethal Anti-Personnel Area Protection

Taser Area Denial Device (TADD)

Typical Capabilities

- Integral sensor detects intruder
- 120° forward protection zone
- TADD can be positioned for overlapping coverage zones
- High voltage darts are fired from multiple ports on TADD over the 120° forward protection angle
- Intruders are immobilized (but unharmed) until high voltage pulses are stopped (under automatic control or by remote operator)



Note: TADD is normally buried or camouflaged; entire unit is visible for purposes of illustration only.

FIG. 1

Tasertron TADD - Capabilities

KEY

PCB = Printed Circuit Board

FB = Firing Bay

HVX = High Voltage Transformer

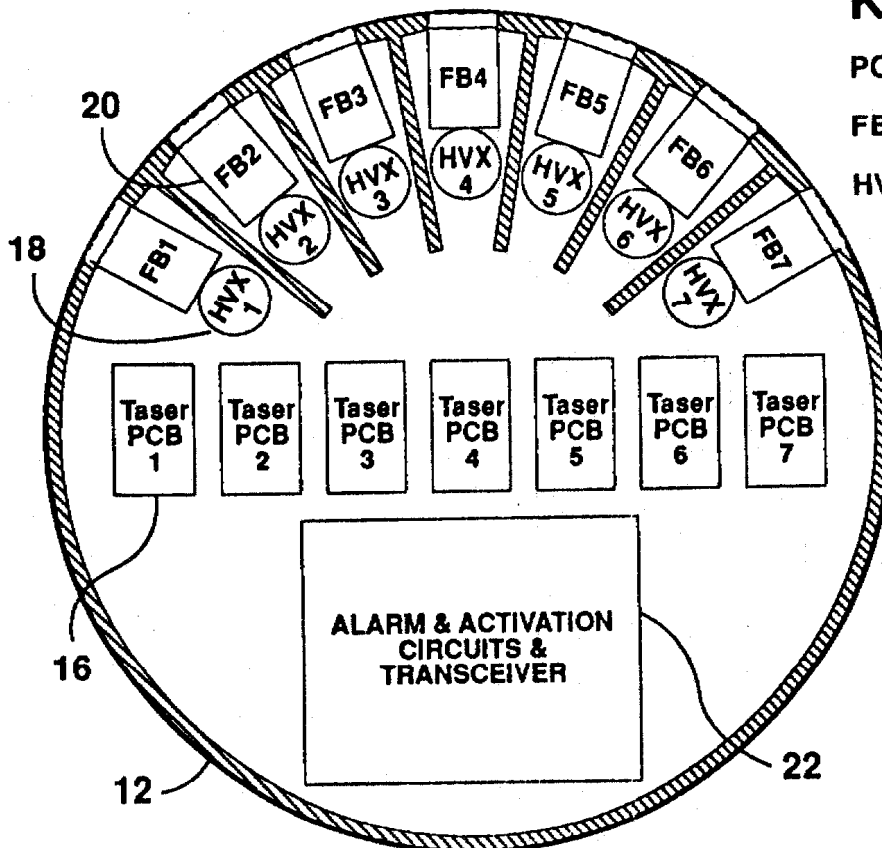


FIG. 2

Tasertron TADD - Internal Layout